2. The optical data transmission method of claim 1 wherein the second clock is phase-modulated by the header information.

3. An optical data transmission system to transmit an optical packet composed of a header and data characterized by that the header information is carried on a second clock which has a frequency equal to one integer of that of a first clock carrying the data and synchronizes with the first clock.

4. The optical data transmission system of claim 3 wherein the second clock is phase-modulated by the header information.

5. An optical transmitter to output an optical packet composed of a header and data, comprising:

a frequency divider to generate a second clock which synchronizes with a first clock carrying the data and has a frequency equal to one integer of that of the first clock;

a phase modulator to modulate a phase of the second clock by the header information; and

a data arranger to arrange the first clock carrying the data after the output data from the phase modulator.

6. The optical transmitter of claim 5 further comprising a converter to convert the output data from the data arranger into an optical signal.

7. An optical transmission method to output an optical packet composed of a header and data, comprising steps of:

generating a second clock which synchronizes with a first clock carrying the data and has a frequency equal to one integer of that of the first clock;

modulating a phase of the second clock with the header information; and

arranging the first clock which carries the data after the phase-modulated second clock.

8. The optical transmission method of claim 7 further comprising a step of converting the phase-modulated second clock and the following first clock carrying the data into an optical signal.

9. An optical switcher to switch an optical packet signal composed of a data carried on a first clock and a header carried on a second clock which has a frequency equal to one integer of that of the first clock and synchronizes the first clock, comprising:

a plurality of optical input terminals;

a plurality of optical dividers to divide each input light of the plurality of the optical input terminals into two portions;

a plurality of header extractors to extract the header from one of the two portions divided by each of the plurality of the dividers;

a plurality of optical delays to delay the other of the two portions divided by each of the plurality of the optical dividers for a predetermined period;

an optical route switcher to switch a route of each output light from the plurality of the optical delays; and

a switch controller to determine a route of an optical signal to enter the corresponding optical input terminal and to control the optical route switcher according to output from each of the plurality of the header extractors.

10. The optical switcher of claim 9 wherein the each header extractor comprises a photodetector to convert an input light from the corresponding optical divider into an electric signal, a filter to

extract a frequency component of the second clock from the output of the photodetector, and a demodulator to demodulate the header information from the output of the filter.

11. (New) An optical data transmission method to transmit an optical packet, the optical packet comprising a header and data, the method comprising:

providing a first clock, which is used for clocking the data;

generating a second clock synchronized with the first clock by dividing the first clock by an integer; and

generating the header information using the second clock.

12. (New) The optical data transmission method of claim 11 wherein generating the header information using the second clock comprises phase-modulating the second clock to generate the header information.

13. (New) An optical data transmission system comprising:

a first clock circuit that produces a first clock;

a divider that produces a second clock by dividing the first clock by an integer; and

a packet generation circuit that generates a packet header using the second clock.

14. (New) The optical data transmission system of claim 13 wherein the packet generation circuit generates packet header information by phase-modulating the second clock.

15. (New) A packet generator, which generates a packet comprising a header and data, the packet generator comprising:

a first clock circuit that produces a first clock;

a frequency divider that generates a second clock, synchronized with the first clock, having a frequency equal to a frequency of the first clock divided by an integer;

a phase modulator that creates a modulated header by phase modulating the second clock with the header; and

a data arranger that arranges the data within the packet after the header.

16. (New) The packet generator of claim 15 further comprising a converter that converts the packet into an optical signal.

17. (New) A data transmission method, that provides a packet comprising a header and data, the method comprising:

providing a first clock;

modulating the first clock with the data to produce modulated data;

generating a second clock by dividing the first clock by an integer;

phase modulating the second clock with the header information to provide header data; and

arranging the packet such that the header data is transmitted before the modulated data.

18. (New) The method of claim 17 further comprising converting the packet into an optical signal.

19. (New) An optical switcher, the optical packet comprising data modulated on a first clock and a header modulated on a second clock, the second clock having a frequency equal a frequency of the first clock divided by an integer and being synchronized to the first clock, the optical switcher comprising:

a plurality of optical dividers each that receives an optical packet and divides its respective packet into a first optical packet and a second optical packet;

a plurality of header extractors each which extract a header from each of the first optical packets;

a plurality of optical delays each configured to delay one of the second optical packets for a period;

an optical route switcher that routes each of the second delayed optical packets; and

a switch controller that determines a route of each of the delayed second optical packets according to the extracted header.

D1 Cont.

20. (New) The optical switcher of claim 19 wherein the each header extractor comprises:

a photodetector to convert optical packets into electric signals;

a filter to extract a component corresponding to the header portion of the optical packets from the output of the photodetector; and

a demodulator to demodulate header information from the output of the filter.